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INTAKE CODE: **UCMP1604DSBA**

MODULE CODE & NAME: **CT050-3-M-DAP-PT DATA ANALYTICAL PROGRAMMING**

ASSIGNMENT

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CONTENT

ACKNOWLEDGEMENT

1.0 INTRODUCTION

Initial Findings from Data

Based on the statistics given for year 2014, there are a total of 43 states with population above 100,000. Top 3 cities in the United States of America with the most population are New York at 8.5 million, Los Angeles at 3.9 million and Chicago at 2.7 million. New York with the highest population contributing 11% of the total overall population of 100,000 and above is also the main contributor in majority of the offenses reported. For example, from the 10 types of offenses type listed, New York are in Top 3 highest in number from 8 out of 10 offenses. The 8 offenses are violent crime, murder, rape, robbery, aggravated assault, property crime, burglary and larceny-theft. While for motor vehicle theft and Arson, the number of cases are higher in Los Angeles and Houston. New York is also a city with very high violent crime reported at 24,000 cases which is double of Los Angeles, Chicago and Houston.

It is observed that property crime and larceny-theft are extremely high in number of cases as compared to other offenses. New York tops in property crime with 63,000 cases, followed by Houston at 53,000 and Los Angeles at 45,000. While for larceny-theft, New York tops at 52,000 followed by Houston at 34,000 and Chicago at 28,000. Based on the data, property crime and larceny-theft are highly correlated with the population size of the state. The bigger the population tend to have high property crime and larceny-theft cases. The correlation also holds true for all other offenses reported where bigger population contribute to most of the crimes. For example, the top 4 States based on population size against total population namely New York (10%), Los Angeles (5%), Chicago (3.5%) and Houston (2.8%) tops on all 10 types of offenses.

However, when we drill down based on number of offenses against the population size Spokane, Washington have the highest percentage at 9.1% followed by Salt Lake City, Utah at 8.4% and Springfield, Missouri at 8.1%. While if compare with the Top 3 cities in terms of population, New York crimes over populations are only at 2.1%, Los Angeles at 2.5% and Chicago at 3.7%. Whereas cities with the lowest crime case against their population resides in California with 14 cities are below 2% rate namely Carlsbad, Chula Vista, Daly City, Fremont, Garden Grove, Glendale, Irvine, Murrieta, Orange, Santa Ana, Simi Valley, Sunnyvale, Thousand Oaks and Torrance.

Therefore, the report indicates that the higher the population of a particular area will result in higher crime rate which may be due to a variety factors such as immigrant influx, literacy level, size of companies and area at coastal line. Overall, preliminary figures showed an increase of 1.7 percent in number of violent crimes for first 6 months of 2015 as compared to 2014 of the same period.

Objectives

The key objective of undertaking this analysis is to identify any patterns or particular state policy helps in improvement in crime prevention even though it is marginal. By studying and analyzing the datasets, the report aims are as follow:

> **Objective 1:** To analyze total crime mean of all states comparing year 2014 and 2015
> **Objective 2:** To identify Top 3 dangerous cities and Top 3 safest cities of identified states
> **Objective 3:** To identify Top 3 cities on highest crime over population ratio from the identified states
> **Objective 4:** To identify Top 10 crime over population ratio cities in 2014 and 2015
> **Objective 5:** To identify Top 3 highest Rape Cases Cities in 2014 and 2015

2.0 DATA SETS

There are total 4 data sets provided. Table 1 show percentage change by populations group for first 6 months comparing year 2015 and 2014. Table 2 indicates summary of percentage change by Region for first 6 months comparing year 2015 and 2014. Table 3 provide year on year percentage change comparison from 2011 to 2015. This table explained the trend by crime types. Table 4 list out crime data by states and crime type for year 2014 and 2015 for resident populations of 100,000 or more. With the details in Table 4, more analysis can be perform using the data which consist of 15 variables as below:
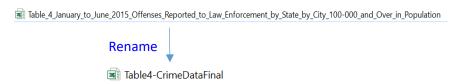
- States
- City
- Year
- Population
- Violent Crime
- Murder
- Rape (Revised Definition)
- Rape (Legacy Definition)
- Robbery
- Aggravated Assault
- Property Crime
- Burglary
- Larceny-Theft
- Motor Vehicle Theft
- Arson

3.0 METHODOLOGIES

Before data can be used for analysis, data need to undergo pre-processing. 3 main steps include data cleaning, data integration and data transformation. The data set is obtained from U.S. Department of Justice Federal Bureau of Investigation. The main essential steps to prepare the data are data cleaning and integration.
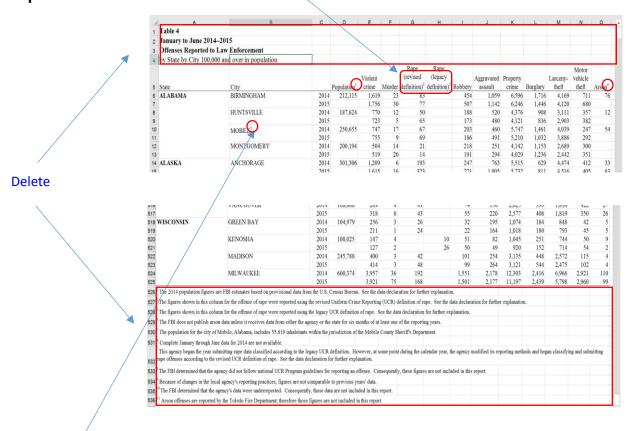
A) Data Preparation and Cleaning

Step 1: Rename file name to shorter name for ease of import.

Step 2: Remove Titles and move all header to Row 1

Step 3: Remove Footer
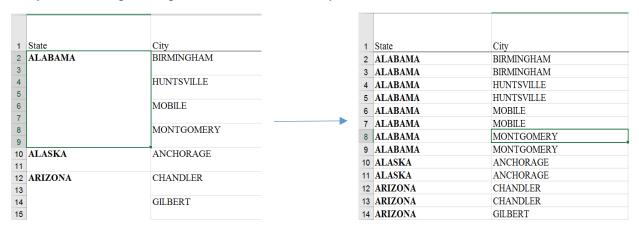
Step 4: Remove brackets in header label

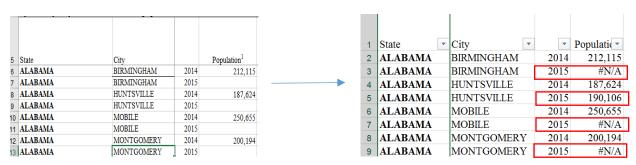
Step 5: Remove footnote indication number from header and city

Step 6: Rename header label to remove space

Violent_crime	Murder	Rape_revised _definition	Rape_legacy _definition	Robbery	Aggravated _assault	Property_ crime	Burglary	Larceny_ theft	Motor_ve hicle_theft

Step 7: Unmerge merged data and fill data by row

	State	City
1	State	City
2	ALABAMA	BIRMINGHAM
3		
4		HUNTSVILLE
5		
6		MOBILE
7		
8		MONTGOMERY
9		
10	ALASKA	ANCHORAGE
11		
12	ARIZONA	CHANDLER
13		
14		GILBERT
15		

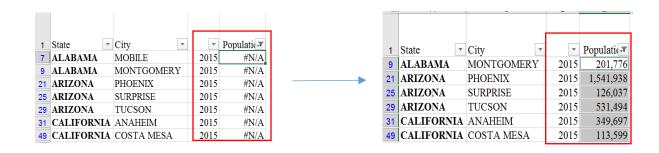|	State	City
1	State	City
2	ALABAMA	BIRMINGHAM
3	ALABAMA	BIRMINGHAM
4	ALABAMA	HUNTSVILLE
5	ALABAMA	HUNTSVILLE
6	ALABAMA	MOBILE
7	ALABAMA	MOBILE
8	ALABAMA	MONTGOMERY
9	ALABAMA	MONTGOMERY
10	ALASKA	ANCHORAGE
11	ALASKA	ANCHORAGE
12	ARIZONA	CHANDLER
13	ARIZONA	CHANDLER
14	ARIZONA	GILBERT

Step 8: 2015 population data is missing from the given data. Therefore, added in 2015 population data from Table 4 January to June 2016 source from U.S. Department of Justice Federal Bureau of Investigation. During the process, still found missing data as below.

	State	City		Population[1]
5	State	City		Population[1]
6	ALABAMA	BIRMINGHAM	2014	212,115
7	ALABAMA	BIRMINGHAM	2015	
8	ALABAMA	HUNTSVILLE	2014	187,624
9	ALABAMA	HUNTSVILLE	2015	
10	ALABAMA	MOBILE	2014	250,655
11	ALABAMA	MOBILE	2015	
12	ALABAMA	MONTGOMERY	2014	200,194
13	ALABAMA	MONTGOMERY	2015	

	State	City		Population
1	State	City		Population
2	ALABAMA	BIRMINGHAM	2014	212,115
3	ALABAMA	BIRMINGHAM	2015	#N/A
4	ALABAMA	HUNTSVILLE	2014	187,624
5	ALABAMA	HUNTSVILLE	2015	190,106
6	ALABAMA	MOBILE	2014	250,655
7	ALABAMA	MOBILE	2015	#N/A
8	ALABAMA	MONTGOMERY	2014	200,194
9	ALABAMA	MONTGOMERY	2015	#N/A

Step 9: Based on Table 4 Crime in the United States by Region, Geographic, Division and State 2014-2015 source from U.S. Department of Justice Federal Bureau of Investigation the total population growth rate is at 0.79%. Therefore, this estimate growth (%) is used to fill in the remaining missing values for 2015 population.

Step 10: Fill missing values with '0'.

Step 11: Upload clean data into SAS to perform analysis

```
4  Proc import datafile='/home/tp0425720/DAP/Table4-CrimeDataFinal.xls'
5      DBMS=XLS
6      OUT=DAP.Table4;
7      GETNAMES=YES;
8  RUN;
9
10 PROC CONTENTS DATA=DAP.Table4; RUN;
```

The CONTENTS Procedure

Data Set Name	DAP.TABLE4	Observations	520
Member Type	DATA	Variables	16
Engine	V9	Indexes	0
Created	05/13/2017 13:48:14	Observation Length	160
Last Modified	05/13/2017 13:48:14	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
10	Aggravated_assault	Num	8	BEST11.		Aggravated_assault
15	Arson	Num	8	BEST8.		Arson
12	Burglary	Num	8	BEST9.		Burglary
2	City	Char	29	$29.	$29.	City
13	Larceny_ theft	Num	8	BEST9.		Larceny_ theft
14	Motor_vehicle_theft	Num	8	BEST10.		Motor_vehicle_theft
6	Murder	Num	8	BEST7.		Murder
16	P	Char	9	$9.	$9.	P
4	Population	Num	8	BEST11.		Population
11	Property_crime	Num	8	BEST9.		Property_crime
8	Rape_legacy_definition	Num	8	BEST12.		Rape_legacy_definition
7	Rape_revised_definition	Num	8	BEST12.		Rape_revised_definition
9	Robbery	Num	8	BEST8.		Robbery
1	State	Char	15	$15.	$15.	State
5	Violent_crime	Num	8	BEST10.		Violent_crime
3	Year	Num	8	BEST7.		Year

Found excess column P being captured in the summary. Added in drop column code as below to delete the P column.

```
15 /* To drop last blank column of the excel*/
16 DATA DAP.Table4_v2; /* To create a new table name*/
17     Set dap.table4; /* source table name*/
18     drop P;
19 run;
20
21 PROC CONTENTS DATA=DAP.Table4_v2;
22 RUN;
```

The CONTENTS Procedure			
Data Set Name	DAP.TABLE4_V2	**Observations**	520
Member Type	DATA	**Variables**	15
Engine	V9	**Indexes**	0
Created	05/13/2017 14:08:59	**Observation Length**	152
Last Modified	05/13/2017 14:08:59	**Deleted Observations**	0
Protection		**Compressed**	NO
Data Set Type		**Sorted**	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Alphabetic List of Variables and Attributes						
#	**Variable**	**Type**	**Len**	**Format**	**Informat**	**Label**
10	Aggravated_assault	Num	8	BEST11.		Aggravated_assault
15	Arson	Num	8	BEST8.		Arson
12	Burglary	Num	8	BEST9.		Burglary
2	City	Char	29	$29.	$29.	City
13	Larceny_ theft	Num	8	BEST9.		Larceny_ theft
14	Motor_vehicle_theft	Num	8	BEST10.		Motor_vehicle_theft
6	Murder	Num	8	BEST7.		Murder
4	Population	Num	8	BEST11.		Population
11	Property_crime	Num	8	BEST9.		Property_crime
8	Rape_legacy_definition	Num	8	BEST12.		Rape_legacy_definition
7	Rape_revised_definition	Num	8	BEST12.		Rape_revised_definition
9	Robbery	Num	8	BEST8.		Robbery
1	State	Char	15	$15.	$15.	State
5	Violent_crime	Num	8	BEST10.		Violent_crime
3	Year	Num	8	BEST7.		Year

Based on content procedure summary above, there are 15 variables and 520 observations data ready to be analyse in dataset DAP.Table_V2. All variables are numeric type except City and State variables are in character.

B) Exploration of data using different SAS functions and data steps to create summary reports using methodologies

1) Sum up Rape Revised Definition and Rape Legacy Definition and create a new column

```
1  /*Total Rape Calculation*/
2  DATA DAP.Rape_Merged;
3      SET DAP.Table4_v2;
4      Rape_Merged = SUM(Rape_revised_definition,Rape_legacy_definition);
5  RUN;
```

Figure1: Merged Rape column

Using the data step above, 2 columns indicating Rape figures are merged as shown in Figure 1 above.

2) Sum up total crime and Sort by year and descending total crime

```
7  /*Total Crime Calculation Then Sort by Year and Descending Total Crime*/
8  DATA DAP.Total_Crime;
9     SET DAP.Table4_v2;
10    Total_Crime = SUM(Violent_crime,Murder,Rape_revised_definition,Rape_legacy_definition,
11             Robbery,Aggravated_assault,Property_crime,Burglary,
12             Larceny_theft,Motor_vehicle_theft,Arson);
13 RUN;
14
15 Proc sort data=dap.total_crime out=dap.total_crime_descending;
16        by Year descending total_crime;
17 RUN;
18
19 PROC PRINT data=dap.total_crime_descending;
20 RUN;
```

All crime types are sum up and a new column is created to reflect the total crime which is then sorted highest to lowest by year. Results for both years are shown in Figure 2 and Figure 3.

Figure 2: Year 2014 Results

The results show that Top 5 highest crimes City in Year 2014 as below :-

1) New York
2) Houston
3) Chicago
4) Los Angeles
5) San Antonio

Figure 3: Year 2015 Results

261	NEW YORK	NEW YORK	2015	8550861	23225	60300	6410	50526	3364	0	116524
262	TEXAS	HOUSTON	2015	2275221	10216	48909	9597	32644	6668	332	85938
263	CALIFORNIA	LOS ANGELES	2015	3962726	10814	45362	8190	29648	7524	638	83342
264	ILLINOIS	CHICAGO	2015	2728695	10969	36468	5650	26005	4813	242	69111
265	TEXAS	SAN ANTONIO	2015	1463586	4005	35261	5576	26572	3113	119	52079
266	ARIZONA	PHOENIX	2015	1541937.831	4513	27356	6645	17089	3622	0	46649
267	PENNSYLVANIA	PHILADELPHIA	2015	1567810	7648	23292	3936	16915	2441	152	45117
268	CALIFORNIA	SAN FRANCISCO	2015	863782	3453	27001	2653	20854	3494	160	40214
269	TEXAS	DALLAS	2015	1301977	4342	21508	5095	12778	3635	196	39118
270	TENNESSEE	MEMPHIS	2015	657936	5517	17445	4720	11535	1190	134	34523
271	MICHIGAN	DETROIT	2015	673225	5711	13515	3329	6810	3376	420	32062
272	MARYLAND	BALTIMORE	2015	621252	4224	14194	3577	8205	2412	132	28763

The results show that Top 5 highest crimes City in Year 2015 as below :-

1) New York
2) Houston
3) Los Angeles
4) Chicago
5) San Antonio

3) To calculate Total Crime Against Population and Sort by Year and Descending

```
22  /*Total Crime Against Population Calculation Then Sort by Year and Descending*/
23  DATA DAP.Crime_Population;
24      SET DAP.Table4_v2;
25      Crime_Population = (SUM(Violent_crime,Murder,Rape_revised_definition,Rape_legacy_definition,
26                  Robbery,Aggravated_assault,Property_crime,Burglary,
27                  Larceny_theft,Motor_vehicle_theft,Arson))/Population;
28      format crime_population percent10.2;
29  RUN;
30
31  Proc sort data=dap.crime_population out=dap.crime_population_descending;
32          by Year descending crime_population;
33  RUN;
34
35  PROC PRINT data=dap.crime_population_descending;
36  RUN;
```

Data steps is to calculate total crime against population. The derived number is then formatted to percentage. The crime against population percentage is sorted highest to lowest.

Results are shown in Figure 4 and Figure 5.

Figure 4: Year 2014 Results

Obs	State	City	Year	Population	Burglary	Larceny_theft	Motor_vehicle_theft	Arson	Crime_Population
1	WASHINGTON	SPOKANE	2014	211025	1625	6259	1120	28	6.13%
2	ALABAMA	BIRMINGHAM	2014	212115	1716	4169	711	76	5.82%
3	TENNESSEE	MEMPHIS	2014	654922	5148	11709	1343	151	5.51%
4	MICHIGAN	DETROIT	2014	684694	4390	6629	4729	235	5.50%
5	MISSOURI	SPRINGFIELD	2014	165280	864	4294	561	29	5.48%
6	UTAH	SALT LAKE CITY	2014	192368	730	5807	818	46	5.34%
7	COLORADO	PUEBLO	2014	108591	914	2375	362	20	5.32%
8	MISSOURI	ST. LOUIS	2014	318574	1756	5435	1425	86	5.16%
9	TENNESSEE	CHATTANOOGA	2014	174449	991	3999	513	6	5.03%
10	OHIO	CLEVELAND	2014	388655	3113	4687	1737	138	5.02%

The results show that Top 5 highest crime against population City in Year 2014 as below:-

1) Spokane
2) Birmingham
3) Memphis
4) Detroit
5) Springfield

Figure 5: Year 2015 Results

261	MISSOURI	SPRINGFIELD	2015	154090	935	4438	588	30	6.26%
262	UTAH	SALT LAKE CITY	2015	193887.7072	995	6309	1037	20	6.12%
263	MISSOURI	ST. LOUIS	2015	317095	1947	6031	1630	79	5.95%
264	NEW YORK	ROCHESTER	2015	112542	696	2502	377	44	5.68%
265	ALABAMA	BIRMINGHAM	2015	213790.7085	1446	4120	680	0	5.56%
266	TENNESSEE	MEMPHIS	2015	657936	4720	11535	1190	134	5.25%
267	COLORADO	PUEBLO	2015	108810	1028	1974	358	19	5.21%
268	WASHINGTON	SPOKANE	2015	212698	1400	5379	813	24	5.13%
269	VIRGINIA	RICHMOND	2015	109716	672	2577	318	32	5.13%
270	FLORIDA	ORLANDO	2015	261726.4325	1588	5753	533	25	4.80%
271	CALIFORNIA	SAN BERNARDINO	2015	216477	1562	2174	1314	28	4.80%

The results show that Top 5 highest crime against population City in Year 2015 as below:-

1) Springfield
2) Salt Lake City
3) St. Louis
4) Rochester
5) Birmingham

At data exploration stage using SAS program, it is important to familiarize with different SAS functions to effectively analyzing the data. For the purpose of this report, main focus will involve data steps such as summation, division, sort procedure, tabulate procedure and mean procedure. To also explore display of data in bar charts to better visualize analysis.

4.0 ANALYSIS & FINDINGS

Objective 1: To analyze total crime mean of all states comparing year 2014 and 2015

```
15  /*--Set output size--*/
16  ods graphics / reset width=10in height=5.2in imagemap;
17
18  /*--SGPLOT proc statement--*/
19  proc sgplot data=DAP.TOTAL_CRIME;
20      /*--TITLE and FOOTNOTE--*/
21      title "Total Crime (Mean) By State";
22      footnote2 j=l "FBI";
23
24      /*--Bar chart settings--*/
25      vbar State / response=Total_Crime group=Year groupdisplay=Cluster stat=Mean
26          name='Bar';
```

Figure 6

Figure 6 display total crime (mean) by state. Based on average total crime, Maryland crime number is leading followed by New Mexico and New York for both year 2014 and 2015. While the lowest crime number by states are North Dakota followed by South Carolina and New Hampshire.

Figure 7

Total Crime Summary

State	2014 Total_Crime Mean	2015 Total_Crime Mean	All Total_Crime Mean
ALABAMA	8784.00	8341.75	8562.88
ALASKA	9007.00	10241.00	9624.00
ARIZONA	8314.11	10718.44	9516.28
CALIFORNIA	5781.11	6289.73	6035.42
COLORADO	4853.13	4613.75	4733.44
CONNECTICUT	3224.75	3053.50	3139.13
FLORIDA	6332.00	6191.00	6261.50
GEORGIA	8185.00	8305.60	8245.30
HAWAII	0.00	19970.00	9985.00
IDAHO	3193.00	3134.00	3163.50
ILLINOIS	11655.25	11065.63	11360.44
INDIANA	4460.67	4320.67	4390.67
IOWA	4694.50	5062.50	4878.50
KANSAS	6826.50	6850.75	6838.63
KENTUCKY	14614.50	14963.50	14789.00
LOUISIANA	8911.75	8427.50	8669.63
MARYLAND	27575.00	28763.00	28169.00
MASSACHUSETTS	3551.75	3264.50	3408.13
MICHIGAN	8468.17	6961.67	7714.92
MISSISSIPPI	8281.00	7220.00	7750.50
MISSOURI	10707.20	11023.60	10865.40
MONTANA	3325.00	3548.00	3436.50
NEBRASKA	5905.00	6000.00	5952.50
NEVADA	5087.67	5318.67	5203.17
NEW HAMPSHIRE	2991.00	3210.00	3100.50
NEW JERSEY	3633.17	3564.33	3598.75
NEW MEXICO	24660.00	26379.00	25519.50
NEW YORK	24621.67	23228.67	23925.17
NORTH CAROLINA	4976.40	5023.00	4999.70
NORTH DAKOTA	1972.00	2303.00	2137.50
OHIO	12983.17	13061.83	13022.50
OKLAHOMA	13669.00	12883.67	13276.33

(Continued)

FBI

Total Crime Summary

State	2014 Total_Crime Mean	2015 Total_Crime Mean	All Total_Crime Mean
OREGON	4692.50	4340.00	4516.25
PENNSYLVANIA	17329.67	16452.33	16891.00
RHODE ISLAND	5026.00	4420.00	4723.00
SOUTH CAROLINA	3061.00	2984.00	3022.50
SOUTH DAKOTA	3642.00	3868.00	3755.00
TENNESSEE	13553.50	13014.67	13284.08
TEXAS	10665.23	10252.70	10458.97
UTAH	3427.00	5861.33	4644.17
VIRGINIA	4662.57	4301.86	4482.21
WASHINGTON	9982.43	9011.00	9496.71
WISCONSIN	8408.00	8047.00	8227.50

FBI

```
proc tabulate data=dap.total_crime;
        class year state;
        var total_crime;
        table state, (year all)*total_crime*mean;
        Title 'Total Crime Summary';
        footnote 'FBI';

run;
```

Figure 7 shows the average crime number by states in table format which details out state with its crime (mean) for year 2014 and 2015. From the report, we can understand clearly the mean number of the states displayed in bar chart of Figure 6.

There is a total of 43 states shown in the reports by crime (mean) for year 2014 and 2015. Top average crime is led by Maryland with 28,169, followed by New Mexico with 25,519 and New York with 23,925. While the lowest crime number by states are North Dakota with 2,135 followed by South Carolina with 3,022 and New Hampshire with 3,100.

Therefore, based on this report Maryland, New Mexico and New York are the most dangerous states to live in. While North Dakota, South Carolina and New Hampshire will be the safest states to live in.

Objective 2: To identify Top 3 dangerous cities and Top 3 safest cities of identified states

A) **Top 3 states as below are identified to be analyse on its Top 3 dangerous cities for the year of 2014 and 2015**

1) New York
2) Texas
3) California

```sas
10  /*Objective 2 : A)To identify Top 3 dangerous cities*/
11  Proc sort data=dap.total_crime;
12          by State descending total_crime;
13  RUN;
14
15  /*Top 3 Dangerous Cities in 2014*/
16
17  Proc print data=dap.total_crime_descending (obs=3);
18      title 'Top 3 Dangerous Cities of New York in 2014';
19      var State City Total_Crime;
20      where state = 'NEW YORK' and Year=2014;
21  Run;
22
23  Proc print data=dap.total_crime_descending (obs=3);
24      title 'Top 3 Dangerous Cities of TEXAS in 2014';
25      var State City Total_Crime;
26      where state = 'TEXAS' and Year=2014;
27  Run;

36  /*Top 3 Dangerous Cities in 2015*/
37
38  Proc print data=dap.total_crime_descending (obs=3);
39      title 'Top 3 Dangerous Cities of New York in 2015';
40      var State City Total_Crime;
41      where state = 'NEW YORK' and Year=2015;
42  Run;
43
44  Proc print data=dap.total_crime_descending (obs=3);
45      title 'Top 3 Dangerous Cities of TEXAS in 2015';
46      var State City Total_Crime;
47      where state = 'TEXAS' and Year=2015;
48  Run;
49
50  Proc print data=dap.total_crime_descending (obs=3);
51      title 'Top 3 Dangerous Cities of California in 2015';
52      var State City Total_Crime;
53      where state = 'CALIFORNIA' and Year=2015;
54  Run;
```

Figure 8: Top 3 Dangerous Cities 2014   **Figure 9: Top 3 Dangerous Cities 2015**

Top 3 Dangerous Cities of New York in 2014

Obs	State	City	Total_Crime
347	NEW YORK	NEW YORK	122462
349	NEW YORK	BUFFALO	10825
351	NEW YORK	ROCHESTER	6604

Top 3 Dangerous Cities of New York in 2015

Obs	State	City	Total_Crime
348	NEW YORK	NEW YORK	116524
350	NEW YORK	BUFFALO	9093
352	NEW YORK	ROCHESTER	6398

Top 3 Dangerous Cities of TEXAS in 2014

Obs	State	City	Total_Crime
419	TEXAS	HOUSTON	91701
421	TEXAS	SAN ANTONIO	55719
424	TEXAS	DALLAS	38920

Top 3 Dangerous Cities of TEXAS in 2015

Obs	State	City	Total_Crime
420	TEXAS	HOUSTON	85938
422	TEXAS	SAN ANTONIO	52079
423	TEXAS	DALLAS	39118

Top 3 Dangerous Cities of California in 2014

Obs	State	City	Total_Crime
30	CALIFORNIA	LOS ANGELES	71050
32	CALIFORNIA	SAN FRANCISCO	33722
34	CALIFORNIA	SAN DIEGO	24295

Top 3 Dangerous Cities of California in 2015

Obs	State	City	Total_Crime
29	CALIFORNIA	LOS ANGELES	83342
31	CALIFORNIA	SAN FRANCISCO	40214
33	CALIFORNIA	SAN DIEGO	24344

For the purpose to identify which is the most dangerous and safest cities, analysis is to drill down further into the cities data. 3 states are identified prior to analysis of the Top 3 cities namely New York, Texas and California. In Figure 8 and Figure 9, we can observe that New York cities total crime has dropped for its Top 3 cities. Texas also displayed the same trend year on year. However, California crime increase for all its 3 cities. The summary also shows that there are no changes in each states Top 3 cities spot in terms of top number of crimes. This analysis will be analyse further in the objective 3 drilling down to crime over population on whether population density impact the crime rate.

B) Top 3 states as below are identified to be analyse on its Top 3 safest cities for the year of 2014 and 2015

1) New Jersey
2) Illinois
3) Oklahoma

```
56  /*Objective 2 : B)To identify Top 3 SAFEST cities*/
57  Proc sort data=dap.total_crime out=dap.total_crime_ascending;
58          by State total_crime;
59  RUN;
60
61  PROC PRINT data=dap.total_crime_ascending;
62  RUN;
63
64  /*Top 3 Safest Cities in 2014*/
65  Proc print data=dap.total_crime_ascending (obs=3);
66      title 'Top 3 Safest Cities of New Jersey in 2014';
67      var State City Total_Crime;
68      where state = 'NEW JERSEY' and Year=2014;
69  Run;
70
71  Proc print data=dap.total_crime_ascending (obs=3);
72      title 'Top 3 Safest Cities of Illinois in 2014';
73      var State City Total_Crime;
74      where state = 'ILLINOIS' and Year=2014;
75  Run;
76
77  Proc print data=dap.total_crime_ascending (obs=3);
78      title 'Top 3 Safest Cities of Oklahoma in 2014';
79      var State City Total_Crime;
80      where state = 'OKLAHOMA' and Year=2014;
81  Run;
82
```

```
77  Proc print data=dap.total_crime_ascending (obs=3);
78      title 'Top 3 Safest Cities of Oklahoma in 2014';
79      var State City Total_Crime;
80      where state = 'OKLAHOMA' and Year=2014;
81  Run;
82
83  /*Top 3 Safest Cities in 2015*/
84  Proc print data=dap.total_crime_ascending (obs=3);
85      title 'Top 3 Safest Cities of New Jersey in 2015';
86      var State City Total_Crime;
87      where state = 'NEW JERSEY' and Year=2015;
88  Run;
89
90  Proc print data=dap.total_crime_ascending (obs=3);
91      title 'Top 3 Safest Cities of Illinois in 2015';
92      var State City Total_Crime;
93      where state = 'ILLINOIS' and Year=2015;
94  Run;
95
96  Proc print data=dap.total_crime_ascending (obs=3);
97      title 'Top 3 Safest Cities of Oklahoma in 2015';
98      var State City Total_Crime;
99      where state = 'OKLAHOMA' and Year=2015;
100 Run;
```

Figure 10: Top 3 Safest Cities 2014

Top 3 Safest Cities of New Jersey in 2014

Obs	State	City	Total_Crime
334	NEW JERSEY	EDISON TOWNSHIP	834
336	NEW JERSEY	WOODBRIDGE TOWNSHIP	1203
338	NEW JERSEY	ELIZABETH	3501

Top 3 Safest Cities of Illinois in 2014

Obs	State	City	Total_Crime
241	ILLINOIS	NAPERVILLE	913
244	ILLINOIS	ELGIN	1302
245	ILLINOIS	AURORA	2132

Top 3 Safest Cities of Oklahoma in 2014

Obs	State	City	Total_Crime
383	OKLAHOMA	BROKEN ARROW	1091
386	OKLAHOMA	TULSA	16877
388	OKLAHOMA	OKLAHOMA CITY	23039

Figure 11: Top 3 Safest Cities 2015

Top 3 Safest Cities of New Jersey in 2015

Obs	State	City	Total_Crime
333	NEW JERSEY	EDISON TOWNSHIP	812
335	NEW JERSEY	WOODBRIDGE TOWNSHIP	967
337	NEW JERSEY	ELIZABETH	3424

Top 3 Safest Cities of Illinois in 2015

Obs	State	City	Total_Crime
242	ILLINOIS	NAPERVILLE	918
243	ILLINOIS	ELGIN	1090
247	ILLINOIS	AURORA	2141

Top 3 Safest Cities of Oklahoma in 2015

Obs	State	City	Total_Crime
384	OKLAHOMA	BROKEN ARROW	1295
385	OKLAHOMA	TULSA	16475
387	OKLAHOMA	OKLAHOMA CITY	20881

From the 3 identified states namely New Jersey, Illinois and Oklahoma, Figure 10 & Figure 11 display the comparison on respective Top 3 safest cities. New Jersey shows a overall drop in total crime for its Top 3 cities Edison Township, Woodbridge Township and Elizabeth. For Illinois, Naperville shows a slight increase while Elgin drop and Aurora increase comparing year 2014 and 2015. Oklahoma state, only Broken Arrow city shows an increase in total crime while both Tulsa and Oklahoma City crime rate drop year on year.

Objective 3: To identify Top 3 cities on highest crime over population ratio from the identified States below.

1) **Washington**
2) **Alabama**
3) **Tennessee**

```
15 /*--Set output size--*/
16 ods graphics / reset width=10in height=5.2in imagemap;
17
18 /*--SGPLOT proc statement--*/
19 proc sgplot data=DAP.CRIME_POPULATION_DESCENDING    (where=(City
20         in ('SPOKANE' , 'BIRMINGHAM', 'MEMPHIS')));
21    /*--TITLE and FOOTNOTE--*/
22    title
23        "Top Crime Over Population (Mean) City in Washington, Alabama & Tennessee";
24    footnote2 j=l "FBI";
25
26    /*--Bar chart settings--*/
27    hbar City / response=Crime_Population group=Year groupdisplay=Cluster
28        stat=Mean name='Bar';
29
30    /*--Response Axis--*/
31    xaxis grid;
32 run;
33
34 ods graphics / reset;
35 title;
36 footnote;
```

Figure 12

For this objective, 3 states had been identified namely Washington, Alabama & Tennessee. Analysis is to drill down to identify its Top 3 highest crime over population cities for comparison. The main reason for analysis the crime over population is to understand the impact of population density.

Figure 12 visually display top city of respective states namely Spokane of Washington, Birmingham of Alabama and Memphis of Tennessee. Based on the charts, all cities in the 3 states illustrate a drop in crime over population ratio year on year. Spokane shows the most significant drop in the crime over population ratio comparing year 2014 and 2015 which is a very good sign for Washington state.

```
102  /*Objective 3 : To identify Top 3 crime over population ratio cities*/
103  Proc sort data=dap.crime_population;
104          by State descending crime_population;
105  RUN;
106
107  /*Top 3 crime over population ratio in 2014*/
108
109  Proc print data=dap.crime_population_descending (obs=3);
110      title 'Top 3 Cities Crime Over Population Ratio of Washington in 2014';
111      var State City Crime_Population;
112      where state = 'WASHINGTON' and Year=2014;
113  Run;
114
115  Proc print data=dap.crime_population_descending (obs=3);
116      title 'Top 3 Cities Crime Over Population Ratio of Alabama in 2014';
117      var State City Crime_Population;
118      where state = 'ALABAMA' and Year=2014;
119  Run;
120
121  Proc print data=dap.crime_population_descending (obs=3);
122      title 'Top 3 Cities Crime Over Population Ratio of Tennessee in 2014';
123      var State City Crime_Population;
124      where state = 'TENNESSEE' and Year=2014;
125  Run;

127  /*Top 3 crime over population ratio in 2015*/
128
129  Proc print data=dap.crime_population_descending (obs=3);
130      title 'Top 3 Cities Crime Over Population Ratio of Washington in 2015';
131      var State City Crime_Population;
132      where state = 'WASHINGTON' and Year=2015;
133  Run;
134
135  Proc print data=dap.crime_population_descending (obs=3);
136      title 'Top 3 Cities Crime Over Population Ratio of Alabama in 2015';
137      var State City Crime_Population;
138      where state = 'ALABAMA' and Year=2015;
139  Run;
140
141  Proc print data=dap.crime_population_descending (obs=3);
142      title 'Top 3 Cities Crime Over Population Ratio of Tennessee in 2015';
143      var State City Crime_Population;
144      where state = 'TENNESSEE' and Year=2015;
145  Run;
```

Figure 13: Top 3 Cities Crime Over Population 2014

Figure 14: Top 3 Cities Crime Over Population 2015

Top 3 Cities Crime Over Population Ratio of Washington in 2014

Obs	State	City	Crime_Population
1	WASHINGTON	SPOKANE	6.13%
13	WASHINGTON	TACOMA	4.83%
16	WASHINGTON	EVERETT	4.77%

Top 3 Cities Crime Over Population Ratio of Alabama in 2014

Obs	State	City	Crime_Population
2	ALABAMA	BIRMINGHAM	5.82%
46	ALABAMA	HUNTSVILLE	3.83%
56	ALABAMA	MOBILE	3.59%

Top 3 Cities Crime Over Population Ratio of Tennessee in 2014

Obs	State	City	Crime_Population
3	TENNESSEE	MEMPHIS	5.51%
9	TENNESSEE	CHATTANOOGA	5.03%
12	TENNESSEE	KNOXVILLE	4.86%

Top 3 Cities Crime Over Population Ratio of Washington in 2015

Obs	State	City	Crime_Population
268	WASHINGTON	SPOKANE	5.13%
274	WASHINGTON	TACOMA	4.71%
293	WASHINGTON	EVERETT	4.05%

Top 3 Cities Crime Over Population Ratio of Alabama in 2015

Obs	State	City	Crime_Population
265	ALABAMA	BIRMINGHAM	5.56%
312	ALABAMA	HUNTSVILLE	3.57%
331	ALABAMA	MONTGOMERY	3.30%

Top 3 Cities Crime Over Population Ratio of Tennessee in 2015

Obs	State	City	Crime_Population
266	TENNESSEE	MEMPHIS	5.25%
277	TENNESSEE	CHATTANOOGA	4.65%
279	TENNESSEE	KNOXVILLE	4.57%

Figure 13 and Figure 14 display summary of the Top 3 highest crime over population cities for respective year. For each of the Top 3 cities based on crime over population of all 3 identified shows a drop and this may indicate that the law enforcement agency are focusing on this 3 cities and effort of crime prevention is working even though these are highly population dense cities.

Objective 4: To identify Top 10 crime over population ratio cities in 2014 and 2015

```
147  /*Objective 4 : To identify Top 10 crime over population ratio cities in 2014 and 2015*/
148  Proc print data=dap.crime_population_descending (obs=10);
149      title 'Top 10 Cities Crime Over Population Ratio in 2014';
150      var State City Crime_Population;
151      where Year=2014;
152  Run;
153
154  Proc print data=dap.crime_population_descending (obs=10);
155      title 'Top 10 Cities Crime Over Population Ratio in 2015';
156      var State City Crime_Population;
157      where Year=2015;
158  Run;
```

Figure 15: Top 10 Overall Cities Crime Over Population 2014   **Figure 16: Top 3 Overall Cities Crime Over Population 2015**

Top 10 Cities Crime Over Population Ratio in 2014

Obs	State	City	Crime_Population
1	WASHINGTON	SPOKANE	6.13%
2	ALABAMA	BIRMINGHAM	5.82%
3	TENNESSEE	MEMPHIS	5.51%
4	MICHIGAN	DETROIT	5.50%
5	MISSOURI	SPRINGFIELD	5.48%
6	UTAH	SALT LAKE CITY	5.34%
7	COLORADO	PUEBLO	5.32%
8	MISSOURI	ST. LOUIS	5.16%
9	TENNESSEE	CHATTANOOGA	5.03%
10	OHIO	CLEVELAND	5.02%

Top 10 Cities Crime Over Population Ratio in 2015

Obs	State	City	Crime_Population
261	MISSOURI	SPRINGFIELD	6.26%
262	UTAH	SALT LAKE CITY	6.12%
263	MISSOURI	ST. LOUIS	5.95%
264	NEW YORK	ROCHESTER	5.68%
265	ALABAMA	BIRMINGHAM	5.56%
266	TENNESSEE	MEMPHIS	5.25%
267	COLORADO	PUEBLO	5.21%
268	WASHINGTON	SPOKANE	5.13%
269	VIRGINIA	RICHMOND	5.13%
270	FLORIDA	ORLANDO	4.80%

In this objective, the purpose is to find out when removing the state filter which cities have highest crime over population ratio. By comparing the Top 10 of year 2014 and 2015, Spokane having the highest crime over population in 2014 have drop to number 8 in 2015 which is a significant improvement. This shows major effort from law enforcement agency is going on and it is working. While Birmingham had drop to number 5 in 2015 from number 2 in 2014. However, Springfield shows and increase from 5.48% to 6.26% making it the Top spot in 2015. The law enforcement agency need to identify the cause for crime prevention in the city.

Objective 5: To identify Top 3 highest Rape Cases Cities in 2014 and 2015

```
160  /*Objective 5: To identify Top 5 highest Rape cases Cities in 2014 and 2015*/
161  Proc sort data=dap.Rape_Merged;
162        by descending Rape_Merged;
163  RUN;
164
165  Proc print data=dap.rape_merged (obs=5);
166      title 'Top 5 Cities with Highest Rape in 2014';
167      var State City Rape_Merged;
168      where Year=2014;
169  Run;
170
171  Proc print data=dap.rape_merged (obs=5);
172      title 'Top 5 Cities with Highest Rape in 2015';
173      var State City Rape_Merged;
174      where Year=2015;
175  Run;
176
```

Figure 17: Top 5 Cities with Highest Rape 2014   **Figure 18: Top 5 Cities with Highest Rape 2015**

Top 5 Cities with Highest Rape in 2014

Obs	State	City	Rape_Merged
2	NEW YORK	NEW YORK	1075
5	ILLINOIS	CHICAGO	654
7	PENNSYLVANIA	PHILADELPHIA	577
8	CALIFORNIA	LOS ANGELES	522
9	TEXAS	SAN ANTONIO	518

Top 5 Cities with Highest Rape in 2015

Obs	State	City	Rape_Merged
1	NEW YORK	NEW YORK	1082
3	PENNSYLVANIA	PHILADELPHIA	679
4	CALIFORNIA	LOS ANGELES	665
6	ILLINOIS	CHICAGO	622
10	ARIZONA	PHOENIX	509

For this objective, we would compare the highest rape cases in year 2014 and 2015. San Antonio drop from the Top 5 list in 2015 and is replace by Phoenix. However, the Top 4 cities did not move much. These 4 cities are highly dense cities and subject a lot of factors such as immigrant influx, literacy level, size of companies and area at coastal line.

5.0 CONCLUSION

Key objectives are set in the beginning as below: -

- ➢ **Objective 1:** To analyze total crime mean of all states comparing year 2014 and 2015
- ➢ **Objective 2:** To identify Top 3 dangerous cities and Top 3 safest cities of identified states
- ➢ **Objective 3:** To identify Top 3 cities on highest crime over population ratio from the identified states
- ➢ **Objective 4:** To identify Top 10 crime over population ratio cities in 2014 and 2015
- ➢ **Objective 5:** To identify Top 3 highest Rape Cases Cities in 2014 and 2015

To achieve the above objectives, data is collected, clean, transform and process to deliver the outcome of the objectives. For each analysis for the objective set, new insights are gained.

There is a total of 43 states shown in the reports by crime (mean) for year 2014 and 2015. Top average crime is led by Maryland with 28,169, followed by New Mexico with 25,519 and New York with 23,925. While the lowest crime number by states are North Dakota with 2,135 followed by South Carolina with 3,022 and New Hampshire with 3,100.

Therefore, based on average total crime report Maryland, New Mexico and New York are the most dangerous states to live in. While North Dakota, South Carolina and New Hampshire will be the safest states to live in.

While to drill down further analyzing for the most dangerous and safest cities, we can observe that New York cities total crime has dropped for its Top 3 cities. Texas also displayed the same trend year on year. However, California crime increase for all its 3 cities. The summary also shows that there are no changes in each states Top 3 cities spot in terms of top number of crimes. This analysis will be analyse further in the objective 3 drilling down to crime over population on whether population density impact the crime rate.

A comparison is done on respective Top 3 safest cities. New Jersey shows an overall drop in total crime for its Top 3 cities Edison Township, Woodbridge Township and Elizabeth. For Illinois, Naperville shows a slight increase while Elgin drop and Aurora increase comparing year 2014 and 2015. Oklahoma state, only Broken Arrow city shows an increase in total crime while both Tulsa and Oklahoma City crime rate drop year on year.

Analysis is performed on crime over population. The main reason for analysis the crime over population is to understand the impact of population density. Findings based on analysis of top city of respective states namely Spokane of Washington,

Birmingham of Alabama and Memphis of Tennessee are all cities in the 3 states illustrate a drop in crime over population ratio year on year. Spokane shows the most significant drop in the crime over population ratio comparing year 2014 and 2015 which is a very good sign for Washington state and this may indicate that the law enforcement agency is focusing on this 3 cities and effort of crime prevention is working even though these are highly population dense cities.

In this objective, the purpose is to find out when removing the state filter which cities have highest crime over population ratio. By comparing the Top 10 of year 2014 and 2015, Spokane having the highest crime over population in 2014 have drop to number 8 in 2015 which is a significant improvement. This shows major effort from law enforcement agency is going on and it is working. While Birmingham had drop to number 5 in 2015 from number 2 in 2014. However, Springfield shows and increase from 5.48% to 6.26% making it the Top spot in 2015. The law enforcement agency need to identify the cause for crime prevention in the city.

Lastly, analysis is performed to compare the highest rape cases in year 2014 and 2015. San Antonio drop from the Top 5 list in 2015 and is replace by Phoenix. However, the Top 4 cities did not move much. These 4 cities are highly dense cities and subject a lot of factors such as immigrant influx, literacy level, size of companies and area at coastal line.

6.0 REFERENCES

[1] Field, A. (2013). Discovering Statistics Using IBM SPSS Statistics. 4th Edition. SAGE.

[2] Table 4 January to June 2016 Offenses Reported to Law Enforcement by State by City 100,000 and over population. Available from: https://ucr.fbi.gov/crime-in-the-u.s/2016/preliminary-semiannual-uniform-crime-report-januaryjune-2016

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SAS CODE

Upload data into SAS

```
4  Proc import datafile='/home/tp0425720/DAP/Table4-CrimeDataFinal.xls'
5      DBMS=XLS
6      OUT=DAP.Table4;
7      GETNAMES=YES;
8  RUN;
9
10 PROC CONTENTS DATA=DAP.Table4; RUN;
```

Drop column P

```
14
15 /* To drop last blank column of the excel*/
16 DATA DAP.Table4_v2; /* To create a new table name*/
17     Set dap.table4; /* source table name*/
18     drop P;
19 run;
20
21 PROC CONTENTS DATA=DAP.Table4_v2;
22 RUN;
```

Merge Rape Column

```
1  /*Total Rape Calculation*/
2  DATA DAP.Rape_Merged;
3      SET DAP.Table4_v2;
4      Rape_Merged = SUM(Rape_revised_definition,Rape_legacy_definition);
5  RUN;
```

```
7  /*Total Crime Calculation Then Sort by Year and Descending Total Crime*/
8  DATA DAP.Total_Crime;
9      SET DAP.Table4_v2;
10     Total_Crime = SUM(Violent_crime,Murder,Rape_revised_definition,Rape_legacy_definition,
11                   Robbery,Aggravated_assault,Property_crime,Burglary,
12                   Larceny_theft,Motor_vehicle_theft,Arson);
13 RUN;
14
15 Proc sort data=dap.total_crime out=dap.total_crime_descending;
16        by Year descending total_crime;
17 RUN;
18
19 PROC PRINT data=dap.total_crime_descending;
20 RUN;
```

Sum and sort crime

```
7  /*Total Crime Calculation Then Sort by Year and Descending Total Crime*/
8  DATA DAP.Total_Crime;
9      SET DAP.Table4_v2;
10     Total_Crime = SUM(Violent_crime,Murder,Rape_revised_definition,Rape_legacy_definition,
11                  Robbery,Aggravated_assault,Property_crime,Burglary,
12                  Larceny_theft,Motor_vehicle_theft,Arson);
13 RUN;
14
15 Proc sort data=dap.total_crime out=dap.total_crime_descending;
16        by Year descending total_crime;
17 RUN;
18
19 PROC PRINT data=dap.total_crime_descending;
20 RUN;
```

Calculate crime over population and sort

```
22 /*Total Crime Against Population Calculation Then Sort by Year and Descending*/
23 DATA DAP.Crime_Population;
24     SET DAP.Table4_v2;
25     Crime_Population = (SUM(Violent_crime,Murder,Rape_revised_definition,Rape_legacy_definition,
26                  Robbery,Aggravated_assault,Property_crime,Burglary,
27                  Larceny_theft,Motor_vehicle_theft,Arson))/Population;
28     format crime_population percent10.2;
29 RUN;
30
31 Proc sort data=dap.crime_population out=dap.crime_population_descending;
32        by Year descending crime_population;
33 RUN;
34
35 PROC PRINT data=dap.crime_population_descending;
36 RUN;
```

Objective 1: To analyze total crime mean of all states comparing year 2014 and 2015

To generate total crime by state chart

```
15 /*--Set output size--*/
16 ods graphics / reset width=10in height=5.2in imagemap;
17
18 /*--SGPLOT proc statement--*/
19 proc sgplot data=DAP.TOTAL_CRIME;
20     /*--TITLE and FOOTNOTE--*/
21     title "Total Crime (Mean) By State";
22     footnote2 j=l "FBI";
23
24     /*--Bar chart settings--*/
25     vbar State / response=Total_Crime group=Year groupdisplay=Cluster stat=Mean
26         name='Bar';
```

To generate table of crime (mean) comparing year 2014 and 2015

```
proc tabulate data=dap.total_crime;
          class year state;
          var total_crime;
          table state, (year all)*total_crime*mean;
          Title 'Total Crime Summary';
          footnote 'FBI';

run;
```

Objective 2: To identify Top 3 dangerous cities and Top 3 safest cities of identified states

> **A) Top 3 states as below are identified to be analyse on its Top 3 dangerous cities for the year of 2014 and 2015**

```
10 /*Objective 2 : A)To identify Top 3 dangerous cities*/
11 Proc sort data=dap.total_crime;
12         by State descending total_crime;
13 RUN;
14
15 /*Top 3 Dangerous Cities in 2014*/
16
17 Proc print data=dap.total_crime_descending (obs=3);
18     title 'Top 3 Dangerous Cities of New York in 2014';
19     var State City Total_Crime;
20     where state = 'NEW YORK' and Year=2014;
21 Run;
22
23 Proc print data=dap.total_crime_descending (obs=3);
24     title 'Top 3 Dangerous Cities of TEXAS in 2014';
25     var State City Total_Crime;
26     where state = 'TEXAS' and Year=2014;
27 Run;

36 /*Top 3 Dangerous Cities in 2015*/
37
38 Proc print data=dap.total_crime_descending (obs=3);
39     title 'Top 3 Dangerous Cities of New York in 2015';
40     var State City Total_Crime;
41     where state = 'NEW YORK' and Year=2015;
42 Run;
43
44 Proc print data=dap.total_crime_descending (obs=3);
45     title 'Top 3 Dangerous Cities of TEXAS in 2015';
46     var State City Total_Crime;
47     where state = 'TEXAS' and Year=2015;
48 Run;
49
50 Proc print data=dap.total_crime_descending (obs=3);
51     title 'Top 3 Dangerous Cities of California in 2015';
52     var State City Total_Crime;
53     where state = 'CALIFORNIA' and Year=2015;
54 Run;
```

B) Top 3 states as below are identified to be analyse on its Top 3 safest cities for the year of 2014 and 2015

```
56  /*Objective 2 : B)To identify Top 3 SAFEST cities*/
57  Proc sort data=dap.total_crime out=dap.total_crime_ascending;
58          by State total_crime;
59  RUN;
60
61  PROC PRINT data=dap.total_crime_ascending;
62  RUN;
63
64  /*Top 3 Safest Cities in 2014*/
65  Proc print data=dap.total_crime_ascending (obs=3);
66      title 'Top 3 Safest Cities of New Jersey in 2014';
67      var State City Total_Crime;
68      where state = 'NEW JERSEY' and Year=2014;
69  Run;
70
71  Proc print data=dap.total_crime_ascending (obs=3);
72      title 'Top 3 Safest Cities of Illinois in 2014';
73      var State City Total_Crime;
74      where state = 'ILLINOIS' and Year=2014;
75  Run;
76
77  Proc print data=dap.total_crime_ascending (obs=3);
78      title 'Top 3 Safest Cities of Oklahoma in 2014';
79      var State City Total_Crime;
80      where state = 'OKLAHOMA' and Year=2014;
81  Run;
```

```
77  Proc print data=dap.total_crime_ascending (obs=3);
78      title 'Top 3 Safest Cities of Oklahoma in 2014';
79      var State City Total_Crime;
80      where state = 'OKLAHOMA' and Year=2014;
81  Run;
82
83  /*Top 3 Safest Cities in 2015*/
84  Proc print data=dap.total_crime_ascending (obs=3);
85      title 'Top 3 Safest Cities of New Jersey in 2015';
86      var State City Total_Crime;
87      where state = 'NEW JERSEY' and Year=2015;
88  Run;
89
90  Proc print data=dap.total_crime_ascending (obs=3);
91      title 'Top 3 Safest Cities of Illinois in 2015';
92      var State City Total_Crime;
93      where state = 'ILLINOIS' and Year=2015;
94  Run;
95
96  Proc print data=dap.total_crime_ascending (obs=3);
97      title 'Top 3 Safest Cities of Oklahoma in 2015';
98      var State City Total_Crime;
99      where state = 'OKLAHOMA' and Year=2015;
100 Run;
```

Objective 3: To identify Top 3 cities on highest crime over population ratio from the identified States below.

To generate chart

```
15  /*--Set output size--*/
16  ods graphics / reset width=10in height=5.2in imagemap;
17
18  /*--SGPLOT proc statement--*/
19  proc sgplot data=DAP.CRIME_POPULATION_DESCENDING     (where=(City
20          in ('SPOKANE' , 'BIRMINGHAM', 'MEMPHIS')));
21      /*--TITLE and FOOTNOTE--*/
22      title
23          "Top Crime Over Population (Mean) City in Washington, Alabama & Tennessee";
24      footnote2 j=l "FBI";
25
26      /*--Bar chart settings--*/
27      hbar City / response=Crime_Population group=Year groupdisplay=Cluster
28          stat=Mean name='Bar';
29
30      /*--Response Axis--*/
31      xaxis grid;
32  run;
33
34  ods graphics / reset;
35  title;
36  footnote;

102 /*Objective 3 : To identify Top 3 crime over population ratio cities*/
103 Proc sort data=dap.crime_population;
104         by State descending crime_population;
105 RUN;
106
107 /*Top 3 crime over population ratio in 2014*/
108
109 Proc print data=dap.crime_population_descending (obs=3);
110     title 'Top 3 Cities Crime Over Population Ratio of Washington in 2014';
111     var State City Crime_Population;
112     where state = 'WASHINGTON' and Year=2014;
113 Run;
114
115 Proc print data=dap.crime_population_descending (obs=3);
116     title 'Top 3 Cities Crime Over Population Ratio of Alabama in 2014';
117     var State City Crime_Population;
118     where state = 'ALABAMA' and Year=2014;
119 Run;
120
121 Proc print data=dap.crime_population_descending (obs=3);
122     title 'Top 3 Cities Crime Over Population Ratio of Tennessee in 2014';
123     var State City Crime_Population;
124     where state = 'TENNESSEE' and Year=2014;
125 Run;
```

```
127 /*Top 3 crime over population ratio in 2015*/
128
129 Proc print data=dap.crime_population_descending (obs=3);
130     title 'Top 3 Cities Crime Over Population Ratio of Washington in 2015';
131     var State City Crime_Population;
132     where state = 'WASHINGTON' and Year=2015;
133 Run;
134
135 Proc print data=dap.crime_population_descending (obs=3);
136     title 'Top 3 Cities Crime Over Population Ratio of Alabama in 2015';
137     var State City Crime_Population;
138     where state = 'ALABAMA' and Year=2015;
139 Run;
140
141 Proc print data=dap.crime_population_descending (obs=3);
142     title 'Top 3 Cities Crime Over Population Ratio of Tennessee in 2015';
143     var State City Crime_Population;
144     where state = 'TENNESSEE' and Year=2015;
145 Run;
```

Objective 4: To identify Top 10 crime over population ratio cities in 2014 and 2015

```
147 /*Objective 4 : To identify Top 10 crime over population ratio cities in 2014 and 2015*/
148 Proc print data=dap.crime_population_descending (obs=10);
149     title 'Top 10 Cities Crime Over Population Ratio in 2014';
150     var State City Crime_Population;
151     where Year=2014;
152 Run;
153
154 Proc print data=dap.crime_population_descending (obs=10);
155     title 'Top 10 Cities Crime Over Population Ratio in 2015';
156     var State City Crime_Population;
157     where Year=2015;
158 Run;
```

Objective 5: To identify Top 3 highest Rape Cases Cities in 2014 and 2015

```
160 /*Objective 5: To identify Top 5 highest Rape cases Cities in 2014 and 2015*/
161 Proc sort data=dap.Rape_Merged;
162         by descending Rape_Merged;
163 RUN;
164
165 Proc print data=dap.rape_merged (obs=5);
166     title 'Top 5 Cities with Highest Rape in 2014';
167     var State City Rape_Merged;
168     where Year=2014;
169 Run;
170
171 Proc print data=dap.rape_merged (obs=5);
172     title 'Top 5 Cities with Highest Rape in 2015';
173     var State City Rape_Merged;
174     where Year=2015;
175 Run;
176
```